

PROJECT NUMBER: 4009  
PROJECT TITLE: Smoke Studies  
PROJECT LEADER: B. L. Goodman  
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I. PROJECT STUDIO (R. Slagle)

- A. Objective: Develop subjectively acceptable cigarettes with reduced sidestream visibility.
- B. Results: A final prototype in the low sidestream Trim configuration has been selected:
  1. 10-046-A Wrapper - 4.7% K-Succinate, 0.7% NaCMC, perforated to 50 Coresta.
  2. Trim II Blend/-49 Aftercut System
  3. Filler cut to 40 CPI

Development with DMCP and Engineering has resulted in the capability of DMCP to electrostatically perforate the special CaCO<sub>3</sub> cigarette paper bobbins for production in test market quantities.

Further work continues to analytically and subjectively optimize a low sidestream candidate, in the following directions:

1. Development of a reduced level Mg(OH)<sub>2</sub> Ecusta wrapper, possibly incorporating a lower basis weight.
2. Further evaluation of chemical additives (e.g., MAP) in the KC small particle size CaCO<sub>3</sub> paper.

Factory panel testing of Capri versus three low sidestream Trim models showed no significant difference between Capri and two of the models:

Acceptability

1. 2123-42(PERF)	4.17
2. 2131-41	4.13
3. Capri	4.07

However, the third model (2123-42 Unperforated) was significantly lower (3.92) in acceptability. An internal mailout of a low sidestream candidate (2123-41) and Trim I showed no significant difference (3.95 vs. 3.83).

A 100 mm model with the low sidestream Mg(OH)<sub>2</sub> paper was tested on M/C panel versus a control Marlboro Lights 100 (unidentified). There were significant differences in all attributes with acceptability scores of 4.23 for the control and 4.03 for the test. No further testing of a 100 mm cigarette is planned at this time.

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Porous cigarette paper was coated with a 5% solution of water soluble cellulose acetate with and without a small quantity of added  $\text{CaCO}_3$ . The additives were suggested by G. Keritsis as a way to smooth the smoke and to get some sidestream reduction by melting of coating around the charline. The sidestream visibility for the coated model with  $\text{CaCO}_3$  was decreased by 13% and for the WSCA the reduction was 22%. The coatings made the papers nonporous (55-90 seconds Greiner), which caused mainstream deliveries to increase correspondingly. Preliminary subjective smoking indicated that the coatings might have given the desired smoothing effect compared to what would be expected for non-porous papers. It is questionable whether the coatings contributed to any additional reduction of the SS visibility beyond the effect of the porosity change.

Sidestream visibilities were measured for many different versions of the small particle size  $\text{CaCO}_3$  paper. Higher reductions were seen for the cigarettes made in Louisville than previous models that had been less densely packed with tobacco. All four K-C production papers gave visibility reductions around 58% compared to Capri controls. Perforation of the wrapper did not significantly change the visibility reduction. MAP on the K-C paper gave a 40% reduction, while the Trim I paper gave 12% lower SS visibility than Capri.

C. Plans: Continue investigation of chemical loading on the  $\text{CaCO}_3$  paper, and development of reduced level  $\text{Mg(OH)}_2$  wrappers.

## II. TIPPING PAPER INVESTIGATIONS

A. Objective: To examine different papers for appearance, composition and performance.

B. Results: A series of cigarettes were made with black or white tow on the inner section of a charcoal filter. Each tow combination was wrapped with three different plug wraps and two different tipplings. Selected models were submitted for O/C panel testing of appearance, specifically at the filter junction.

The white tow models were rated as having less obvious junctions than the black ones. A nonporous perforated plug wrap concealed the junction better than the porous 33ML, with a higher opacity porous plug wrap falling in the middle. The difference between a higher basis weight and a normal basis weight tipping was not significant.

C. Plans: Determine the variability of dilution on cigarettes with the perforated plug wrap.

Compare previous combinations with the current ones.

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